# CDP-791/X111ES

# SERVICE MANUAL

*US Model*
*Canadian Model*
*CDP-X111ES*
*AEP Model*
*UK Model*
*CDP-791*

**Photo: CDP-791**

## SPECIFICATIONS

### Compact disc player

| | |
|---|---|
| Frequency response | 2 Hz – 20 kHz ± 0.5 dB |
| Signal-to-noise ratio | More than 108 dB |
| Dynamic range | More than 98 dB |
| Harmonic distortion | Less than 0.0027% |
| Channel separation | More than 100 dB |

### Outputs

| | |
|---|---|
| LINE OUT (FIXED) (phono jacks) | Output level 2 V (at 50 kilohms)<br>Load impedance over 10 kilohms |
| LINE OUT (VARIABLE) (phono jacks) | Output level max. 2 V (at 50 kilohms)<br>Load impedance over 50 kilohms |
| DIGITAL OUT (OPTICAL) (optical output connector) | Wave length 660 nm<br>Output level −18 dBm |
| PHONES (stereo phone jack) | Output level max. 10 mW<br>Load impedance 32 ohms |

### General

| | |
|---|---|
| Power requirements | **US, Canadian Model:**<br>**120 V AC, 60 Hz**<br>**AEP Model:**<br>**220 V – 230 V AC, 50/60 Hz**<br>**UK Model:**<br>**240 V AC, 50 Hz** |

| | |
|---|---|
| Model Name Using Similar Mechanism | CDP-291/391 |
| CD Mechanism Type | CDM14-5BD1 |
| Optcal Pick-Up Block Type | BU-5BD1 |

| | |
|---|---|
| Power consumption | 12 W |
| Dimensions (approx., including projections) | 430×110×280 mm (w/h/d)<br>(17×4³/₄×11¹/₈ inches) |
| Weight (approx.) | 4.0 kg (8 lbs 14 oz) |

### Supplied accessories

| | |
|---|---|
| Audio cord | 1<br>(2 phono plugs – 2 phono plugs) |
| Remote commander | 1 |
| R6 (AA) batteries | 2 |

### Remote commander RM-D791

| | |
|---|---|
| Remote control system | Infrared control |
| Power requirements | 3 V DC with two R6 (size AA) batteries |
| Dimensions | Approx. 62×20×175 mm (w/h/d)<br>(1⁵/₈×¹³/₁₆×7 inches) |
| Weight | Approx. 130 g (4.6 oz)<br>Including batteries |

Design and specifications subject to change without notice.

MICROFILM

**COMPACT DISC PLAYER**

**SONY**

## SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety check before releasing the set to the customer:
Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

### LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA (500 microampers). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2V AC range are suitable. (See Fig. A)

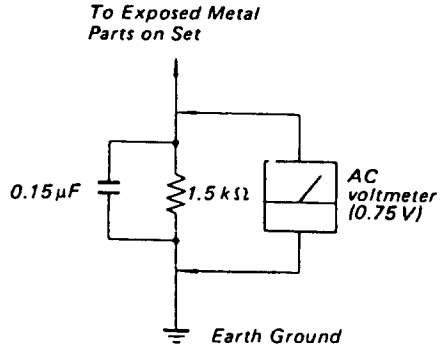



*Fig. A. Using an AC voltmeter to check AC leakage.*

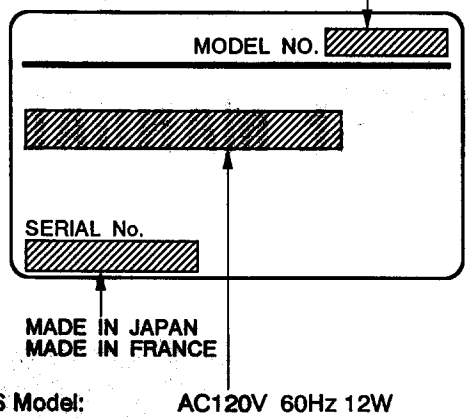
**SAFETY-RELATED COMPONENT WARNING!!**

**COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.**

### MODEL IDENTIFICATION

—Model Number Label—

CDP-791
CDP-X111ES




| | |
|---|---|
| US Model: | AC120V 60Hz 12W |
| Canadian Model: | AC: 120V 60 Hz 12W |
| AEP Model: | AC220 – 230V, 50/60Hz |
| UK Model: | AC240V~50/ 60Hz |

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**ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!**

**LES COMPOSANTS IDENTIFIÉS PAR UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPLÉMENTS PUBLIÉS PAR SONY.**

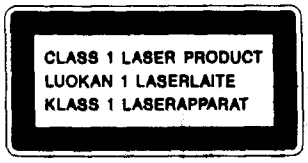
## NOTES ON HANDLING THE OPTICAL PICK-UP BLOCK OR BASE UNIT

The laser diode in the optical pick-up block may suffer electrostatic breakdown because of the potential difference generated by the charged electrostatic load, etc. on clothing and the human body.
During repair, pay attention to electrostatic breakdown and also use the procedure in the printed matter which is included in the repair parts.
The flexible board is easily damaged and should be handled with care.

### NOTES ON LASER DIODE EMISSION CHECK

The laser beam on this model is concentrated so as to be focused on the disc reflective surface by the objective lens in the optical pick-up block. Therefore, when checking the laser diode emission, observe from more than 30cm away from the objective lens.

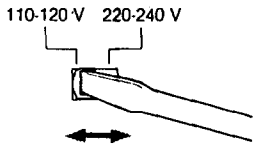
### For UK Model and AEP Model




This Compact Disc player is classified as a CLASS 1 LASER product.
The CLASS 1 LASER PRODUCT label is located on the rear exterior.

## Adjusting Operating Voltage

**For the customers of the model equipped with the voltage selector**
Check that the voltage selector is set to the local power line voltage. If not, set the selector to the correct position before connecting AC power cord to a wall outlet.

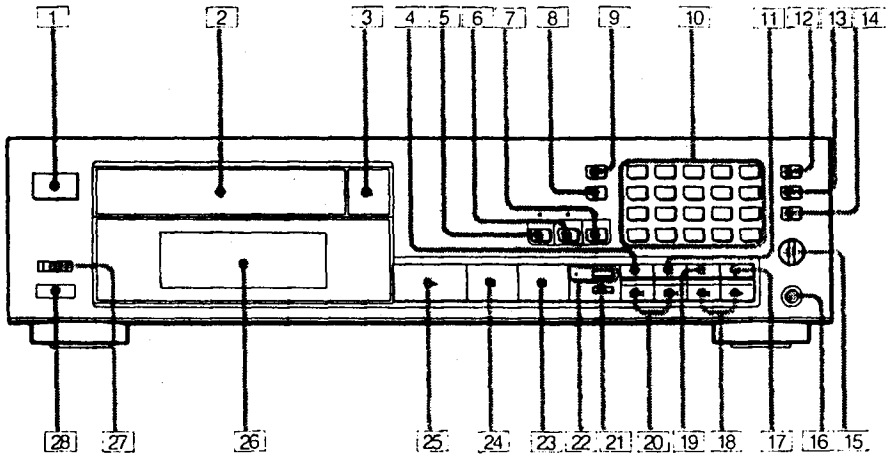



This section is extracted from instruction manual.

# SECTION 1 GENERAL

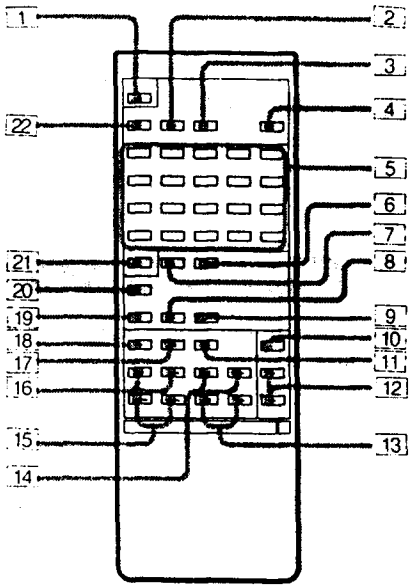
## Location of Controls

### Front Panel




1 POWER switch (18)
2 Disc tray (19)
3 ⏏ OPEN/CLOSE button (18)
4 PEAK SEARCH button (64)
5 CONTINUE button and indicator (30, 40, 44, 52, 58)
6 SHUFFLE button and indicator (39)
7 PROGRAM button and indicator (40, 44)
8 TIME SET button (55, 60)
9 EDIT/TIME FADE button (54, 60)
10 Numeric buttons (22)
11 REPEAT button (39)
12 >20 (over 20) button (22)
13 CHECK (program check) button (42, 50)
14 CLEAR (program clear) button (28, 42, 50)
15 LINE OUT/PHONE LEVEL control (29)
16 PHONES jack
17 MUSIC SCAN button (32)
18 ◀◀ ▶▶ (manual search) buttons (24, 60)
19 FADER button (30, 32)
20 ⏮ ⏭ (AMS*) buttons (22, 45)
21 TIME button (22)
22 A. SPACE (auto space)/A. CUE(auto cue) button and auto cue indicator (28, 62)
23 ■ (stop) button (20)
24 ❚❚ (pause) button (20)
25 ▶ (play) button (20)
26 Display window
27 TIMER switch (38)
28 Remote sensor (18)

## Remote commander



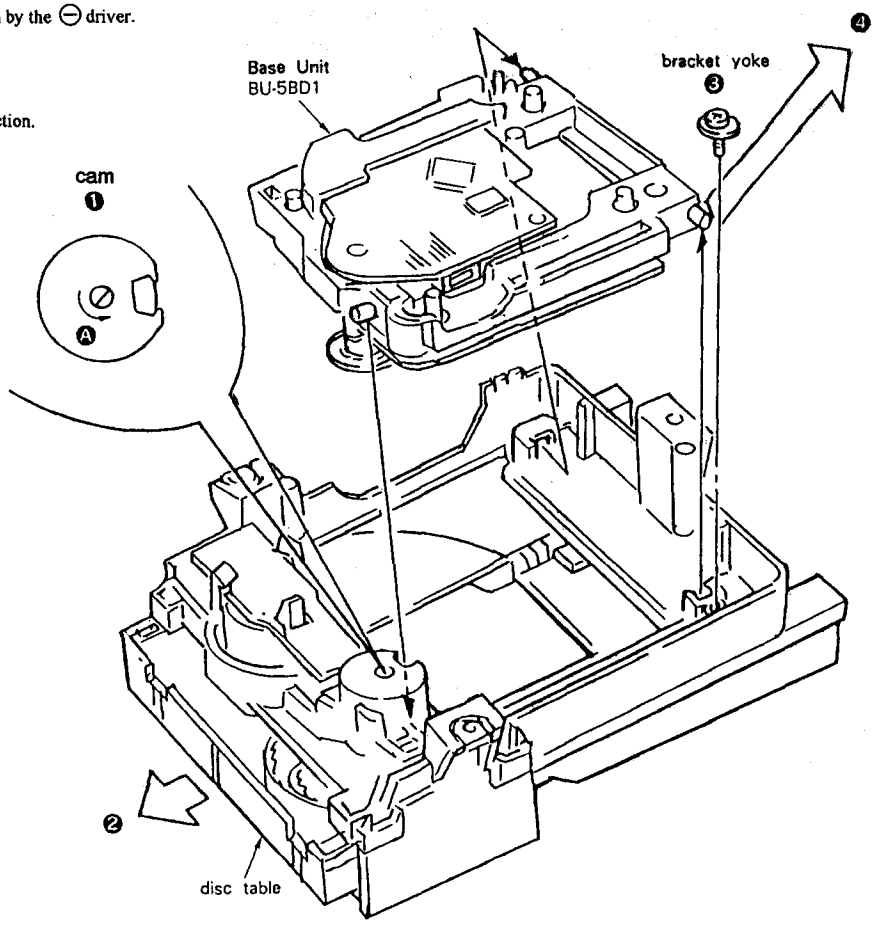

[1] ⏏ OPEN/CLOSE button ⑱
[2] SHUFFLE button ㉑
[3] PROGRAM button ㊵, ㊹
[4] M.SCAN (music scan) button ㉜
[5] Numeric buttons ㉒
[6] CLEAR (program clear) button ㉙, ㊷, ㊿
[7] CHECK button ㊸, ㊾
[8] A ⟷ B repeat button ㉘
[9] A.SPACE (auto space)/A.CUE (auto cue) button ㉖, ㉜
[10] FADER button ㊿, ㊷
[11] ■ (stop) button ⑳
[12] LINE OUT LEVEL + / − (line out/headphone volume) buttons ㉙
[13] ◀◀ ▶▶ SLOW (low speed manual search) buttons ㉔
[14] ◀◀ ▶▶ (manual search) buttons ㉔, ㊿
[15] INDEX buttons ㉔
[16] ⏮ ⏭ AMS buttons ㉒, ㊺
[17] ❚❚ (pause) button ⑳
[18] ▶ (play) button ⑳
[19] CLEAR/REPEAT (A ⟷ B repeat clear/repeat) button ㉘
[20] TIME button ㉒
[21] 20 (over 20) button ㉒
[22] CONTINUE button ㉚, ㊵, ㊹, ㊷, ㊾

# SECTION 2
# DISASSEMBLY

### BASE UNIT REMOVAL

**Note:** Follow the disassembly procedure in the numerical order given.

1. Remove CD mechanism from the set and turn over.
2. Turn the cam ❶ in the Arrow Ⓐ direction by the ⊖ driver.
3. Take out disc table ❷.
4. Remove bracket yoke ❸.
5. Remove BU-5BD1 ❹ in the Arrow ❹ direction.

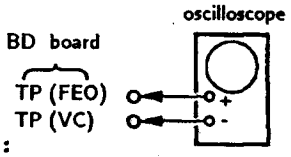


# SECTION 3
# ELECTRICAL BLOCK CHECKING

**Note :**

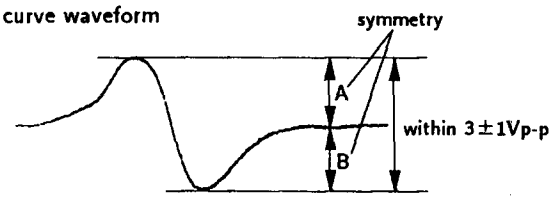
1. CD Block basically constructed to operate without adjustment. Therefore, check each item in order given.
2. Use YEDS-18 disc (3-702-101-01) unless otherwise indicated.
3. Use the oscilloscope with more than 10MΩ impedance.
4. Clean an object lens by an applicator with neutral detergent when the signal level is low than specified value with the following checks.

## S Curve Check




**Procedure :**

1. Connect oscilloscope to test point TP (FEO) on BD board.
2. Connect between test point TP (FES) and TP (VC) by lead wire.
3. Turned Power switch on and actuate the focus serch. (actuate the focus serch when disc table is moving in and out.)
4. Check the oscilloscope waveform (S curve) is symmetrical between A and B. And confirm peak to peak level within 3±1Vp-p.

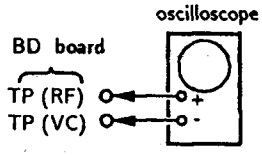



5. After check, remove the lead wire connected in step 2.

**Note :** • Try to mesure several times to make sure that the ratio of A : B or B : A is more than 10 : 7.

• Take sweep time as long as possible and light up the brightness to obtain best waveform.

## RF Level Check

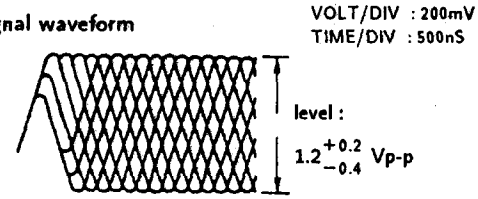



**Procedure :**

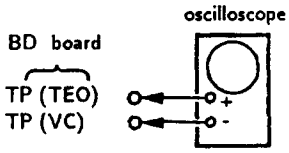
1. Connect oscilloscope to test point TP (RF) on BD board.
2. Turn Power switch on.
3. Put disc (YEDS-18) in and playback.
4. Confirm that oscilloscope waveform is clear and check RF signal level is correct or not.

**Note :**

Clear RF signal waveform means that the shape "◇" can be clearly distinguished at the center of the waveform.

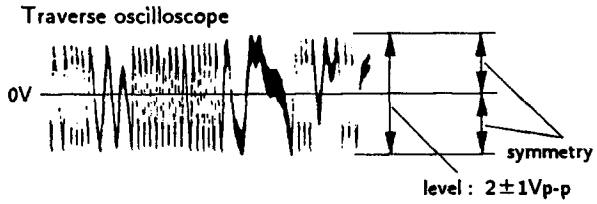



## E-F Balance Check




**Procedure :**

1. Connect test point TP (ADJ) to ground and TP (TES) to TP (VC) with lead wire.
2. Connect oscilloscope to test point TP (TEO) on BD board.
3. Turn Power switch on.
4. Put disc (YEDS-18) in and playback.
5. Confirm that the osilloscope waveform is symmetrical on the top and bottom in relation to 0V, and check this level.

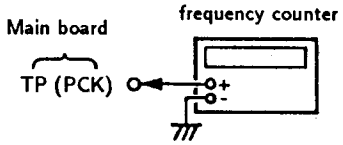



6. Remove the lead wire connected in step 1.

## RF PLL Free-run Frequency Check

**Procedure :**

1. Connect frequency counter to test point (PCK) with lead wire.




2. Turn Power switch on.
3. Confirm that reading on frequency counter is 4. 3218MHz.

## Focus/Tracking Gain

This gain has a margin, so even if it is slightly off. There is no problem.

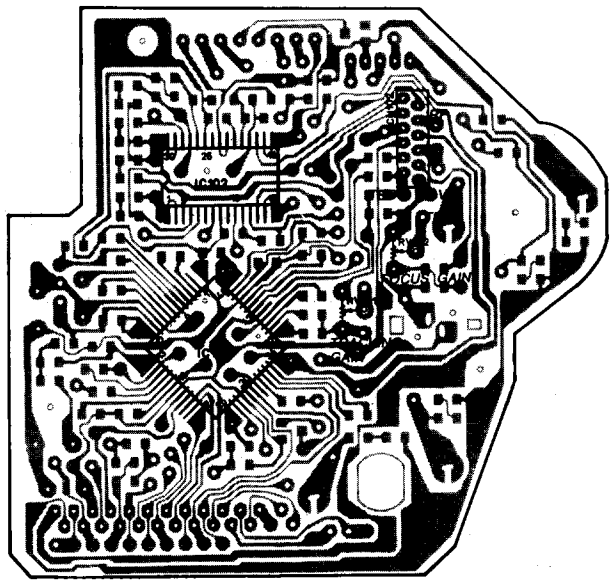
Therefore, do not perform, this adjustment.

Please note that it should be fixed to mechanical center position when you moved and do not know original position.

Adjustment Locations :

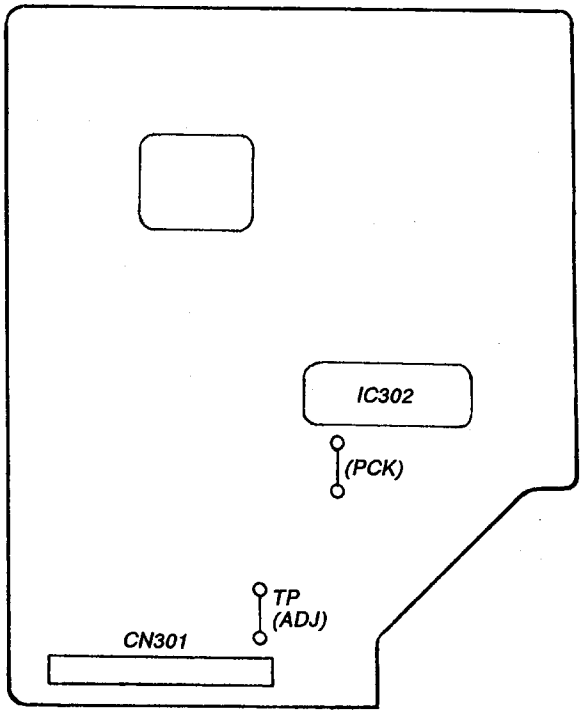
**[BD board]**

— conductor side —



**[Main board]**

**– Component Side –**

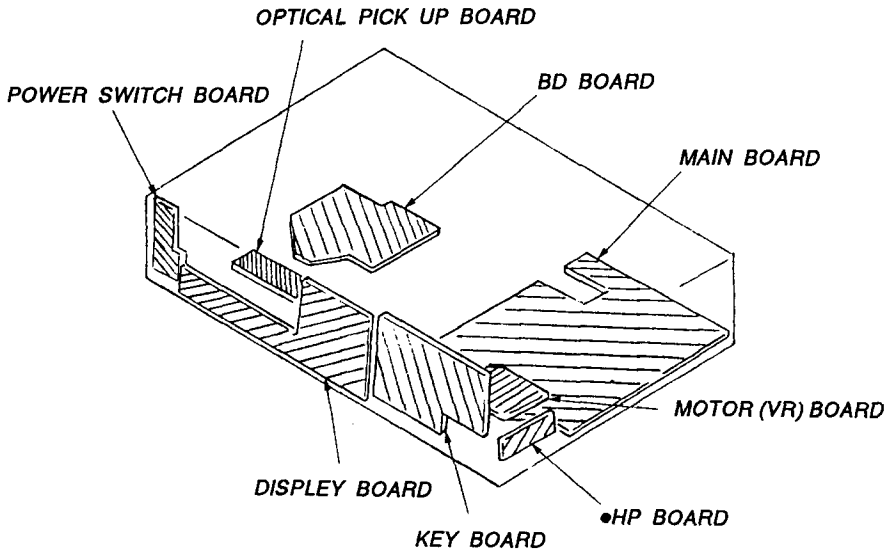


# SECTION 4
# DIAGRAMS

## IC101 (CXA1372Q) PIN DESCRIPTIONS

| PIN NO. | PIN NAME | I/O | FUNCTION |
|---|---|---|---|
| 1 | VC | | 2.5 Volts power supply. |
| 2 | FGD | I | Focus gain adjusting capacitor connected between ② pin and ③ pin. |
| 3 | FS3 | I | Focus gain adjusting capacitor connected between ② pin and ③ pin. |
| 4 | FLB | I | Focus Servo low frequency boost-up capacitor connected. |
| 5 | FEO | O | Focus drive output. |
| 6 | FE− | I | Focus error amp inverted input. |
| 7 | SRCH | I | Connected capacitor to making the focus serch waveform. |
| 8 | TGU | I | Tracking gain adjusting capacitor connected between ⑧ pin and ⑨ pin. |
| 9 | TG2 | I | Tracking gain adjusting capacitor connected between ⑧ pin and ⑨ pin. |
| 10 | AV CC | | +5 Volts power supply. |
| 11 | TAO | O | Tracking drive output. |
| 12 | TA− | I | Tracking amp inverted input. |
| 13 | SL+ | I | Sled amp non-inverted input. |
| 14 | SLO | O | Sled drive output. |
| 15 | SL− | I | Sled amp non-inverted input. |
| 16 | FSET | I | Phase stabilizer setting resistor connected. |
| 17 | ISET | I | Current setting resistor connected. |
| 18 | SSTOP | I | Limit switch connection port. |
| 19 | AV EE | | Ground (0V). |
| 20 | DIRC | I | Direct control port. Non-connected. |
| 21 | LOCK | I | Sled free-run protection is operate at "L". |
| 22 | CLK | I | Serial data transmission clock input form digital signal processor. |
| 23 | XLT | I | Latch input from digital signal processor. |
| 24 | DATA | I | Serial input from digital signal processor. |
| 25 | SENS | O | Outputs internal state corresponding to address. |
| 26 | XRST | I | System reset input. Reset at "L". |
| 27 | C. OUT | O | Tracking counter output. |
| 28 | D GND | | Digitel ground. Grounded |
| 29 | MIRR | O | Mirror output digital signal processor. |
| 30 | DFCT | O | Deffect output. Deffect at "H". |
| 31 | ASY | I | Auto symmetry control input. |
| 32 | EFM | O | EFM Comparator output. |
| 33 | FOK | O | Focus OK. |
| 34 | CC2 | I | Deffect bottom hold input. |
| 35 | CC1 | O | Deffect bottom hold output. |
| 36 | DV CC | | +5 Volts power supply. |
| 37 | CB | I | Deffect bottom hold capacitor connected. |
| 38 | CP | I | Mirror hold capacitor connected. |
| 39 | RFI | I | RF Signal input (Capacitance coupled). |
| 40 | RFO | I | RF Signal input (Direct Coupled). |
| 41 | DV EE | | Grounded (0V). |
| 42 | TZC | I | Tracking Zero-cross comparator input. |
| 43 | TE | I | Tracking error amp input. |
| 44 | TDFCT | I | Deffect correction hold capacitor connected. |
| 45 | ATSC | I | Anti-shock input. |
| 46 | FZC | I | Focus Zero-cross comparator input. |
| 47 | FE | I | Focus error input. |
| 48 | FDFCT | I | Deffect correction hold capacitor connected. |

## • Circuit Boards Location




## • Semiconductor Location

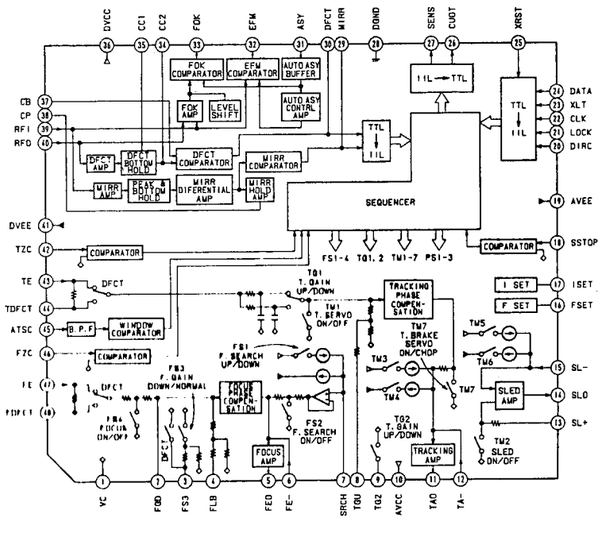
| Ref. No. | Location | Ref. No. | Location |
|---|---|---|---|
| D101 | B-22 | IC202 | G-17 |
| D201 | E-19 | IC203 | G-16 |
| D202 | I-19 | IC301 | H-16 |
| D203 | E-18 | IC302 | G-15 |
| D204 | E-18 | IC303 | G-14 |
| D205 | E-17 | IC304 | H-13 |
| D206 | E-17 | IC305 | E-15 |
| D207 | G-19 | IC306 | D-15 |
| D208 | F-17 | IC307 | C-15 |
| D209 | F-16 | IC391 | B-14 |
| D341 | F-15 | IC401 | C-9 |
| D351 | G-13 | IC403 | B-4 |
| D401 | E-2 | IC451 | H-6 |
| D402 | E-2 | IC471 | I-7 |
| D403 | E-3 | IC491 | H-2 |
| D404 | E-3 | | |
| D405 | E-3 | Q101 | D-22 |
| D406 | B-9 | Q201 | F-19 |
| D407 | B-9 | Q202 | G-18 |
| D408 | B-9 | Q203 | F-18 |
| D409 | B-9 | Q204 | H-18 |
| D410 | B-9 | Q205 | H-18 |
| D411 | B-9 | Q206 | H-17 |
| D412 | B-4 | Q207 | G-18 |
| D413 | B-5 | Q208 | G-18 |
| D414 | B-5 | Q209 | F-16 |
| D415 | B-6 | Q341 | D-13 |
| D416 | B-6 | Q342 | D-14 |
| D417 | D-8 | Q343 | D-13 |
| D418 | D-3 | Q344 | G-13 |
| D419 | F-2 | Q371 | B-14 |
| D420 | F-3 | Q372 | C-16 |
| D421 | F-2 | Q373 | B-14 |
| D471 | J-7 | Q374 | C-16 |
| | | Q375 | C-14 |
| IC101 | D-21 | Q376 | B-16 |
| IC102 | C-21 | Q393 | B-14 |
| IC103 | B-22 | Q419 | A-5 |
| IC201 | F-19 | Q421 | B-2 |

**Note:**

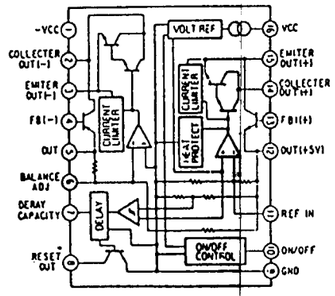
- o——— : parts extracted from the component side.
- ■ : parts mounted on the conductor side.

## • IC Block Diagram

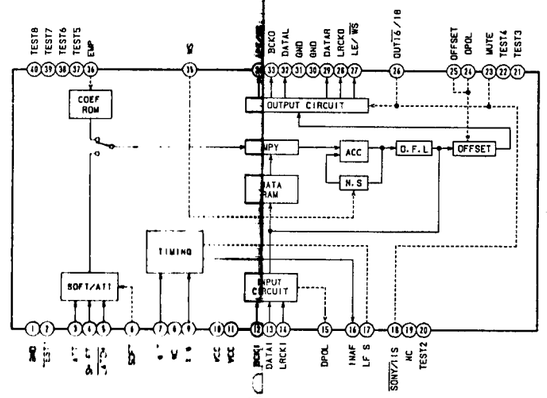
### IC101 CXA1372Q



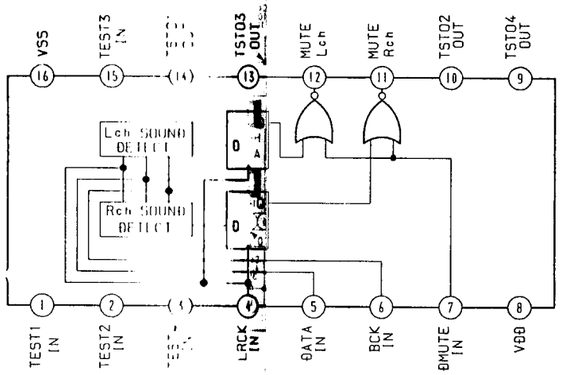

### IC202 M5290P-16




### IC302 CXD1244S




### IC304 CXD2557M

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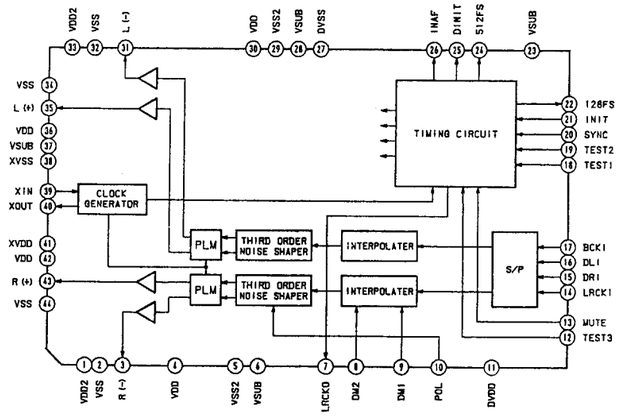
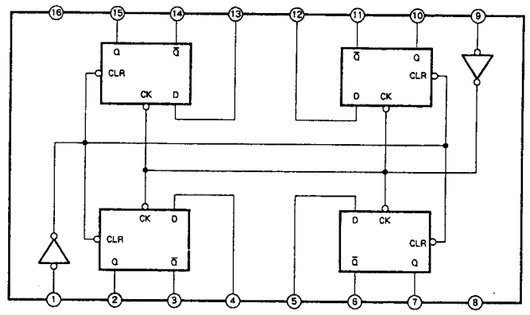
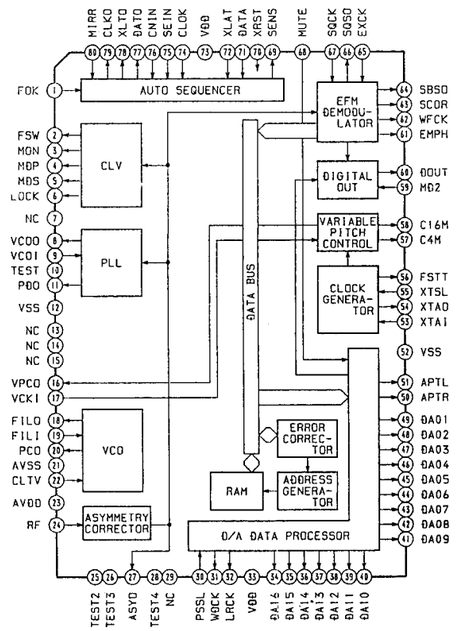



### IC403 74HC175



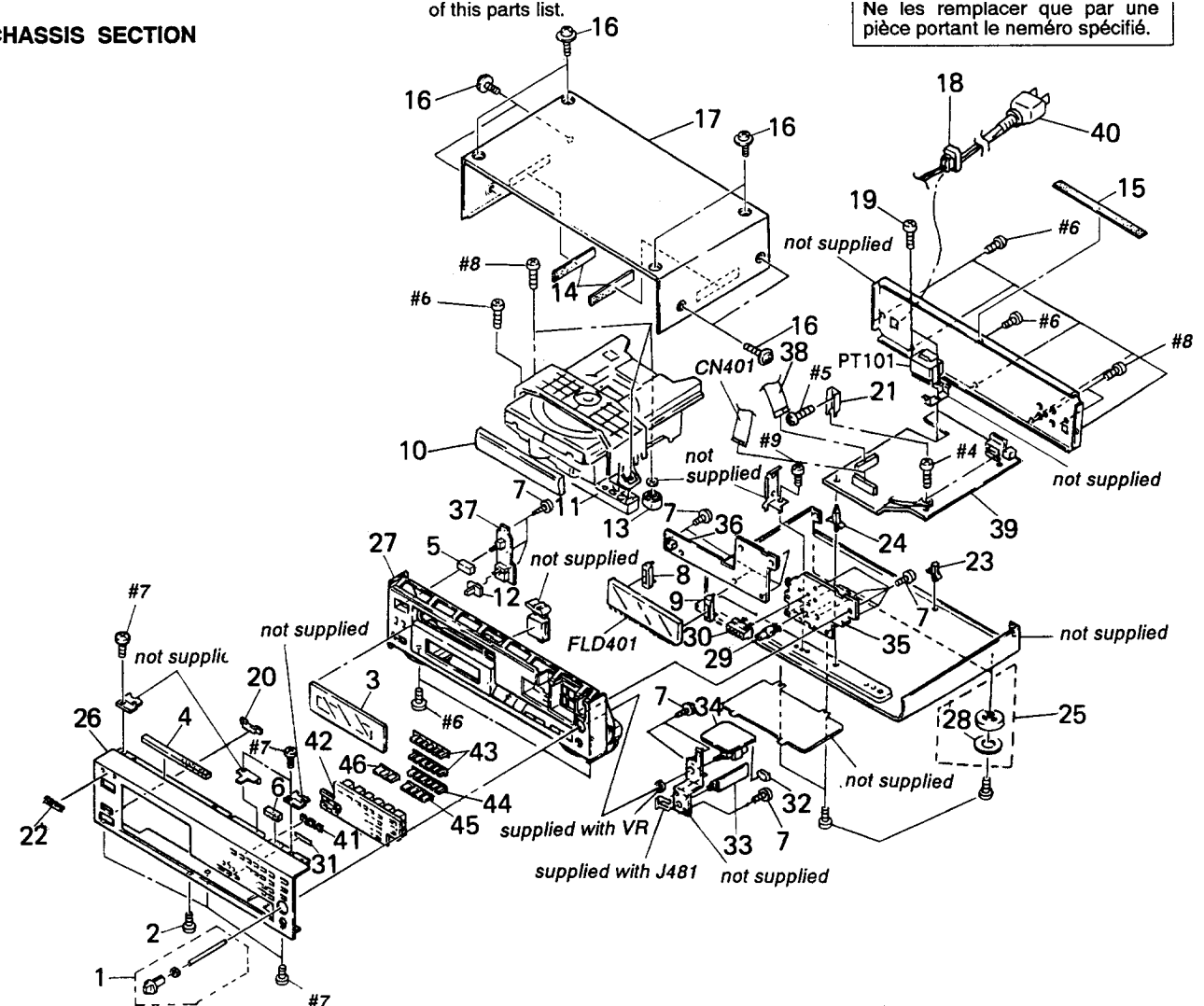

### IC301 CXD2500AQ



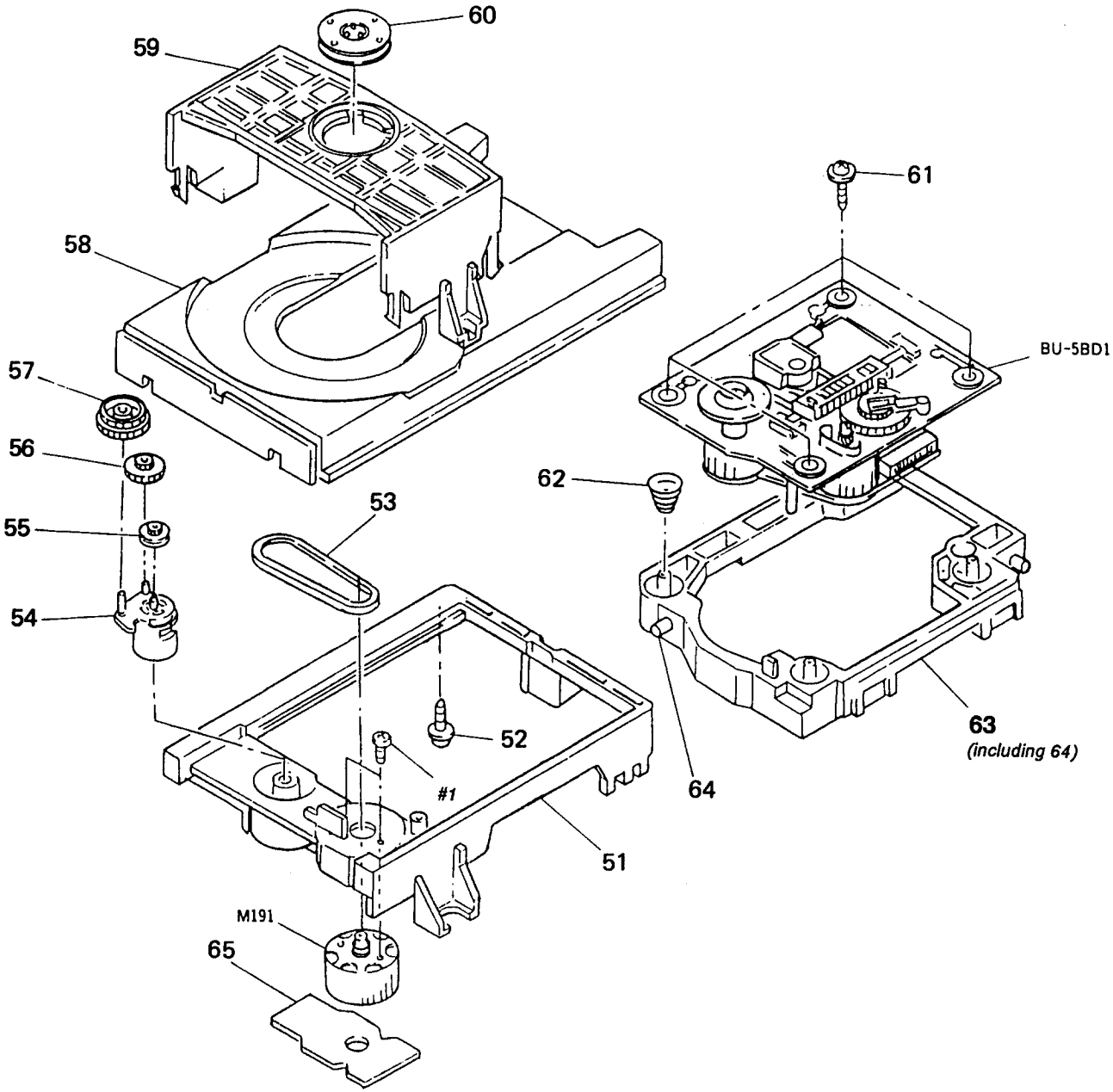
## (1) CHASSIS SECTION

of this parts list.

Ne les remplacer que par une pièce portant le neméro spécifié.



## (2) CD MECHANISM SECTION (CDM14-5BD1)



## (3) OPTICAL PICK-UP BLOCK (BU-5BD1)